

Amendments to the Specification

Please replace the paragraph beginning at page 5, line 4, with the following rewritten paragraph:

In one embodiment of the present invention ~~[[invention]]~~, DNA hybridization on a silica microsphere surface is quantified from the red-shift of an optical resonance wavelength. The present invention may use the fact that the fractional shift of a resonance wavelength $\delta\lambda/\lambda$ may be expressed as $\alpha_{ex}\sigma_s/[\epsilon_0(n_s^2-n_b^2)R]$, where ϵ_0 is the vacuum permittivity, R is the microsphere radius (200 μm), n_s (1.467) and n_b (1.332) are the refractive indices of the microsphere and the buffer solution, respectively. α_{ex} is the excess polarizability (the polarizability of a volume of DNA (or some other target nucleotide chain) in excess of an equal volume of water) and σ_s is the surface density of the bound DNA (or other target nucleotide chain) ~~[[+]]~~ to determine the surface density of bound DNA target molecules.

Please replace the paragraph beginning at page 8, line 6, with the following rewritten paragraph:

The light source 120 may be a laser diode, such as a tunable, distributed feedback laser diode (e.g., 1312.8 nm nominal wavelength, 5 mW, ML776H11F from Mitsubishi of Japan). The optical fiber 110 may be a single mode optical fiber such as smf-28 optical fiber (e.g., from Canadian Instrumentation & Research Ltd. of Ontario, Canada). The detector 130 may be an InGaAs photodetector (e.g., PDA400, from Thorlabs of Newton,

NJ). The microspheres 140,150 may be silica microspheres evanescently coupled to the fiber 110.

Please replace the paragraph beginning at page 9, line 20, with the following rewritten paragraph:

The use of a microspheres to detect a substance, as well as fabrication of such microsphere-based detection systems and their components are described in: U.S. Patent Application Serial No. 10/096,333 (referred to as "the '333 application" and incorporated herein by reference), issued as U.S. Patent No. 7,491,491 on February 7, 2009, titled "DETECTING AND/OR MEASURING A SUBSTANCE BASED ON A RESONANCE SHIFT OF PHOTONS ORBITING A MICROSPHERE," filed on February 12, 2002, and listing Stephen Arnold and Iwao Teraoka as inventors; U.S. Patent Application Serial No. 10/690,979 (referred to as "the '979 application" and incorporated herein by reference), titled "ENHANCING THE SENSITIVITY OF A MICROSPHERE SENSOR," filed on October 22, 2003 and listing Stephen Arnold, Iwao Teraoka and Frank Vollmer as inventors; and U.S. Patent Application Serial No. 10/735,247 (referred to as "the '247 application" and incorporated herein by reference), titled "USING A CHANGE IN ONE OR MORE PROPERTIES OF LIGHT IN ONE OR MORE MICROSPHERES FOR SENSING CHEMICALS USHC AS EXPLOSIVES AND POISON GASES," filed on December 12, 2003 and listing Stephen Arnold, Iwao Teraoka, Yoshiyuki Okamoto and Frank Vollmer as inventors. Each of the foregoing applications is incorporated herein by reference. As will be appreciated by those skilled in the art, various teachings from those applications can be used in concert with the present invention.